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| EXAMINER | |
|---|---|
| ZERVIGON, RUDY | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1763 | |

DATE MAILED: 12/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/930,957 | UI ET AL. | |
| | Examiner | Art Unit | |
| | Rudy Zervigon | 1763 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *6-11* is/are pending in the application.

4a) Of the above claim(s) *10 and 11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-9* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/553,148.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Election/Restrictions*

1. Newly submitted claims 10 and 11 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 10 and 11 are method claims, while the originally presented claims are apparatus claims.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 10 and 11 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### *Specification*

2. The disclosure is objected to because of the following informalities: The specification identifies the physical dimension for sheet resistance as "Ω/□". The "□" dimension is unrecognized.

Appropriate correction is required.

### *Claim Objections*

3. Claim 7 is objected to because of the following informalities: Claim 7 depends from a higher numbered claim 8. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Oda et al (USPat. 5,252,132). Oda teaches film deposition apparatus (Figures 10, 11; column 8, lines 1-28) including:

i. Heating means - Support for this portion of claim 6 is found in the specification in paragraph [0053]. Specifically, the specification teaches "any known methods can be used". Oda teaches a heater (12). As such, Oda teaches an equivalent apparatus that performs the function of heating a substrate (2). As a result, Oda's prior art element 12 for heating performs the identical function of heating the substrate in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

ii. dispersion heads ("nozzles", 37) for discharging plural gases independently – Specifically, Oda teaches nozzles 37 where "each of which has at least one reaction gas nozzle port 37a for ejection of a reaction gas 38. The rates of supply of the reaction gas to the respective reaction gas supply nozzles 37 are independently controlled by means of a mass flow controller..." as such, each of his deposition heads is capable of flow control for plural gases.

iii. Means for introducing the gaseous titanium compound into a first dispersion head, and means for introducing the gaseous compound of a dopant element into a second dispersion head – Support for this portion of claim 6 is found in paragraph [0058]. Specifically, the specification teaches "The titanium compound and the compound of the dopant element, both in a gaseous state, are passed through gas lines 7 and 8, respectively, and supplied to the surface of the silicon substrate 1 from a dispersion head 5. ". Oda teaches gas lines 37,

Figure 10, column 8, lines 1-18. As such, Oda teaches an equivalent apparatus that performs the function of conveying gases. As a result, Oda's prior art elements of gas lines 37 for conveying gases perform the identical function of conveying gases in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

With regard to Applicant's claim limitations of "gaseous titanium" and "dopant element", it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

iv. Oda further teaches means for positioning a bottom discharge end of the first dispersion head for the gaseous titanium compound closer to a surface of the silicon substrate than is a bottom discharge end of the second dispersion head for the gaseous compound of a dopant element - Support for this portion of claim 6 is found in paragraph [0076], [0098]. Specifically, the specification teaches "In FIG. 4, a distance A from bottom ends of the discharge ports for the gaseous titanium compound and the atmospheric gas to the surface of the silicon substrate 1 was set to 4 mm, for example, and a distance B from a bottom end of the discharge port for the dopant element compound to the surface of the silicon substrate 1 was set to 14 mm, for example. The difference between A and B was 10 mm. ". Oda teaches

that a distance from the bottom ends of any of the discharge ports (37a) of the dispersion heads (any of the plural nozzles 37) to a surface of the substrate (2) is variable and controllable (column 8, lines 17-28). As such, Oda teaches an equivalent apparatus that performs the function of providing a variable distance between Oda's dispersion head and Oda's substrate. As a result, Oda's prior art element of 37 for providing a variable distance between Oda's dispersion head and Oda's substrate perform the identical function of "means for positioning" in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

v. Oda further teaches that a distance from the bottom ends of any of the discharge ports (37a) of the dispersion heads (any of the plural nozzles 37) to a surface of the substrate (2) is variable and controllable (column 8, lines 17-28). Inclusive, as shown in Figure 10, Oda's dispersion heads are staggered vertically thus meeting claim 6's limitation where the distance of a bottom end of one discharge port to the surface of the substrate is greater than the distance of a bottom end of one discharge port to the surface of the substrate for the adjacent dispersion head.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claim 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oda et al (USPat. 5,252,132). Oda is discussed above. Oda does not teach the distance/partitioned circumference from the bottom ends of his discharge ports to the surface of the substrate and the

distance/partitioned circumference from the bottom end of the discharge port of another discharge port to the surface of the silicon substrate is 0.1 to 30 mm. Oda further does not teach the relative position between Oda's dispersion head and Oda's substrate surface where "the concentration of the dopant element in the produced titanium oxide film becomes higher from the surface of the titanium oxide film to the surface of the silicon substrate".

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the location of Oda's discharge ports relative to each other and to the substrate.

Motivation to optimize the location of Oda's discharge ports relative to each other and to the substrate is to control the concentration of reactant gases and to improve uniformity and thickness of the deposited film as taught by Oda (column 8, lines 17-28). Further, would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05). Regarding Applicant's intended use claim limitation of "the concentration of the dopant element in the produced titanium oxide film becomes higher from the surface of the titanium oxide film to the surface of the silicon substrate", it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of

performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oda et al (USPat. 5,252,132) in view of Bartholomew et al (USPat. 5,136,975). Oda is discussed above. Oda does not teach conveyor means. Bartholomew teaches a continuous atmospheric pressure CVD device (Figure 4; column 7, lines 37-69). Bartholomew further teaches:

i. conveyor means - Support for this portion of claim 9 is found in lines 26-30, page12. Specifically, the specification teaches "..conveyor means is preferably constituted in such a fashion as to be capable of conveying the substrate from a position immediately below the discharge port of the discharge head for the dopant element compound through a position immediately below the discharge port of the dispersion head for the titanium compound in a gaseous state to the portion immediately below the discharge port for the atmospheric gas.". Bartholomew teaches conveyor means (24) capable of conveying the substrate from a position immediately below a discharge port (96; Figure 4) of a discharge head (36; Figure 4; column 3, lines 50-65) through an adjacent position. As such, Bartholomew teaches an equivalent apparatus that performs the function of conveying the substrate. As a result, Bartholomew's prior art element 24 for conveying the substrate perform the identical function of conveying the substrate in substantially the same way, and produces substantially the same results as the corresponding elements disclosed in the specification (MPEP 2183).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Bartholomew's conveyor to Oda's film deposition apparatus.

Motivation to add Bartholomew's conveyor to Oda's film deposition apparatus is to increase throughput of Oda's semiconductor production as taught by Bartholomew.

***Response to Arguments***

9. Applicant's arguments filed September 16, 2003 are fully considered but they are not persuasive. Applicant argues that Oda does not teach the claim amended limitations of means plus function for operation of the instant dispersion head - "application illustrate that the dispersion head for the titanium gas is closer to the silicon substrate than is the dispersion head for the gaseous compound of a dopant element.".

10. In response to applicant's argument that Oda does not teach the claim amended limitations of means plus function for operation of the instant dispersion head, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). In particular, it is clear from Oda's discussion that "A reaction gas 38 is supplied to the substrate 2 through at least two of the reaction gas supply nozzles 37, each of which has at least one reaction gas nozzle port 37a for ejection of a reaction gas 38. The rates of supply of the reaction gas to the respective reaction gas supply nozzles 37 are independently controlled by means of a mass-flow controller which is not shown." (column 8, lines 10-16) provides identically claimed means as discussed above.

***Conclusion***

11. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.

JEFFRIE R. LUND
PRIMARY EXAMINER